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EXPERIMENTAL FARM
CANADA DEPARTMENT AGRICULTURE
LACOMBE

Visitors Welcome

50 Anniversary

1907-1957

Golden Anniversary

EXPERIMENTAL FARM

LACOMBE *1907 - 1957* ALBERTA

INTRODUCTION

THIS is the story of the Lacombe Experimental Farm, a record of accomplishment during the first half century. Located to serve the large area extending from Calgary north to Lesser Slave Lake and from the Saskatchewan border to the Rockies (an area approximately 350 by 250 miles) in which all the major prairie soil types are found, the Lacombe Farm has grown with the agriculture of the area, has conducted a wide range of experiments to meet the problem of diversification, and has specialized in specific problems of production in certain fields.

In early years with limited land, facilities, and staff, emphasis was on testing and demonstration of varieties and methods found best in other parts of Canada and the United States. Much foundation stock of cereals, forages, and livestock was introduced and distributed from the Farm. As the years passed the research at Lacombe was intensified. Instead of depending entirely on varieties developed elsewhere a program of cereal and forage crop breeding and testing of varieties was initiated to meet the specific conditions in the various soil and climatic zones in the area. Studies of the specific elements needed in fertilizers under different conditions, of the many new chemical weed controls, of cultural methods and other problems in the plant field were undertaken. With livestock, emphasis has been on the most efficient use of grains and the forages, and on breeding and selection studies designed to obtain information on the heritabilities of economic factors, especially of swine. A practical result of the breeding work has been the development of the new "Lacombe" breed of bacon hogs.

Aerial view of the Lacombe Experimental Farm taken in 1956.
Inset shows first buildings on the Farm in 1908.

ANIMAL HUSBANDRY

The Farm's swine herd was established in 1912. First experimental work involved comparisons between the American lard-type breeds and the Canadian Yorkshire. It was demonstrated that the Yorkshire was superior to the other breeds in litter size and in market quality. These results influenced swine breeders concerning its utility and over the years the breed's popularity as to total swine registrations in the country grew from 34 per cent in 1912 to today's figure of nearly 90 per cent.

Since 1947 a major project has involved the production of a new breed from a hybrid foundation (Landrace-Chester X Berkshire), each generation being selected on the performance of litter mates with respect to feed efficiency, rate of growth, and carcass quality. The objective to produce a breed with optimum performance standards and the ability to cross with other breeds, particularly the Yorkshire, and thereby provide hybrid vigor has been achieved. This is indicated by data from tests at three Experimental Farms and from widespread field tests in commercial herds. To facilitate their research, Lacombe's specialists are employing X-ray for measuring the potential carcass quality of a live pig.

In the early years the Lacombe Farm co-operated with other institutions in running tests to formulate the procedures for the Advanced Registry program begun in 1929. Later the Farm's "high-low" breeding project demonstrated clearly that selection of high testing stock would lead to the production of efficient, fast-gaining pigs of high carcass quality. Utilizing these principles, a strain of Yorkshires was developed which in recent years has produced in excess of 80 per cent grade A carcasses.

"Swine Production", a publication based largely on experiments conducted at the Lacombe Farm, is now in its third revised edition. It has had a wide circulation in both French and English and has proved to be a notable contribution.

With cattle the first important work was winter feeding. The data secured from the feeding projects during 1910-1915 provided information that aided and encouraged farmers in the undertaking of feeding operations on a commercial scale. Then much useful information on feeding, management, and cost of production was obtained with the purebred Aberdeen Angus and Holstein herds established at Lacombe in 1913. These were replaced by a herd of

milking strain Shorthorns in 1932. By the forties emphasis was shifted to the production of beef and since 1947 performance testing of beef cattle has been the main cattle research project. Methods for measuring such traits as faster, more economical gaining — so important in cost reduction — the inheritance of these traits, and the selection procedures that will produce most rapid genetic improvement are being investigated. It is interesting to note that in 1955, sixty-six per cent of Alberta's marketed cattle originated in the districts served by the Lacombe Farm.

With poultry, early work involved breed comparisons and tests relating to feeding and management. A strain of Wyandottes was developed giving much improved egg production. Fertility studies conducted from 1945 to 1954 revealed why the Wyandotte, compared with the New Hampshire which has excellent reproductive performance, was an unsatisfactory performer. This research revealed information basic to studies of reproductive efficiency. In 1955 a new breeding project was initiated with White Leghorns to investigate the reliability of short-term laying records in a program to improve egg production through selection; results to date look promising.

CEREAL CROPS

During the past 50 years agriculture in Central Alberta has gradually pushed westward and northward. With the shorter growing season in these regions, early maturing varieties of cereal crops have become much more important. Thanks to cereal crop improvement programs, new varieties have been produced that mature successfully in these areas.

Early cereal crop work at Lacombe was concerned primarily with testing varieties introduced from other parts of Canada and other countries in an effort to assess their adaptability for production within the area served. Varieties recommended on the basis of these tests included Marquis, Prelude, Garnet, and Reward wheat; Victory, Legacy, and Abundance oats; and O.A.C. 21, Mensury, and Trebi barley. Variety testing continues to be an important part of the cereal crop improvement program at Lacombe. Thatcher, Saunders, and Lake wheat; Eagle, Beaver, and Rodney oats; and Olli, Montcalm, Vantage, Husky, and Gateway barley are among the more recently introduced varieties encouraged by Lacombe.

During the 1930's the work with cereal crops was expanded to include a breeding and selection program designed to produce varieties that would prove more adaptable to Central Alberta conditions. Larain oats released in 1946 has proved a popular special-purpose variety for use when very early maturity is essential. It matures some two weeks earlier than Victory and although considerably lower yielding it possesses superior lodging resistance and has a very plump, attractive kernel. Wolfe, an early maturing, high yielding feed barley variety released in 1954 has proved to be highly satisfactory for production on the heavy black soils of Central Alberta. It possesses good lodging resistance, is only about 4 days later maturing than Olli, and yields within 7 per cent of Vantage, a variety which requires about one week more than Wolfe to reach full maturity.

Since the end of World War II much greater emphasis has been placed on the breeding programs. In the spring of 1949, Lacombe became the co-ordinating center for the "Northern Wheat Breeding Project". This project is designed to produce early maturing varieties that will prove superior for production in northern regions. In terms of wheat production the influence of this project extends over an area which produces about 40 per cent of the wheat in Western Canada. The oat and barley breeding programs have likewise been expanded. Good kernel characteristics, lodging resistance and early maturity are given special consideration in the oat program. Loose smut and a number of the foliage diseases of particular concern with barley are being studied with a view to developing resistant varieties of satisfactory agronomic quality.

Plant growth characteristics are being studied with a view to improving selection methods in the breeding programs. Selection has been carried on under controlled greenhouse conditions and marked improvements in root development, tillering habit, speed of growth, yield, and kernel size have been noted. Special studies are under way to establish some definite observable selection indices.

An indication of the importance of cereal crops to the agriculture of the area is reflected in the fact that approximately 50 per cent of the wheat, 75 per cent of the oats, and over 80 per cent of the barley grown in the province is produced in the area served by Lacombe. A marked increase in barley acreage has taken place since 1950 and in 1956 the barley produced in Central Alberta came from approximately 3,000,000 acres.

FIELD HUSBANDRY

Cropping methods and soil management practices are vital to successful farming in Central Alberta. The Farm's crop rotation studies — a major function since its beginning — have achieved outstanding results. Mixed farming rotations, so called because they include the use of cereal and forage crops, have resulted in higher crop yields than all grain rotations, with fewer weeds and less soil erosion. Not only have the mixed farming rotations with one third of the land in a grass-legume mixture produced almost 20 per cent more grain than the grain-grain-fallow rotations over the last 45 years but they have also produced a bonus in the form of hay and potatoes. In the past 20 years, yields in the Farm grain rotation have shown a gradual decline while in the mixed-farming rotation the grain yields are at the same high level as when the land was new.

Early fertilizer experiments showed that broadcasting commercial fertilizers on the surface produced little if any beneficial results. In the twenties it was found that drilling the fertilizer into the moist soil of the seedbed along with the seed gave immediate responses. On fallow, it was demonstrated that generally the main response was from applications of phosphorus; on stubble the addition of nitrogen as well as phosphorus was shown to give substantial yield increases in most cases.

The fertilization of legume-grass hay and pasture crops has been under study since 1952. On the black soils of Central Alberta increases ranging up to three tons per acre of dry matter have been obtained. The testing has shown that on sandy loam soils more nitrogen is required with the phosphorus than on the heavier loam soils.

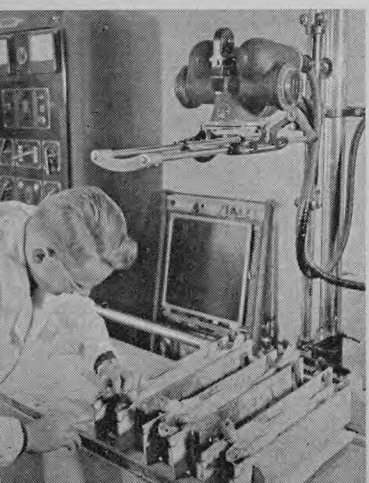
Weed control investigations for many years concerned the study of tillage methods and machines to combat weed competition. With the advent of the new herbicides, weed control research at Lacombe has been enlarged and hundreds of experiments are conducted annually to test the many new chemicals coming on the market. Studies of 2,4-D and MCP formulations for the control of many broad-leaved annual and perennial weeds have stressed the need for treating while the weeds and crop are still seedlings. With some of the noxious weeds, it has been found that specific rates and time of application are necessary to obtain effective control with a

Familiar Scenes

Top (left to right): A. D. McF
crops, discussing varieties at a F
W. J. Doran, forage crops specialis
trefoil in the introductory nursery
and G. M. Ramsay, head gardener
research o

Middle left: Applying anhydrous a
mental plots. *Middle right:* La
underway at Lacombe and Vegre
determine the

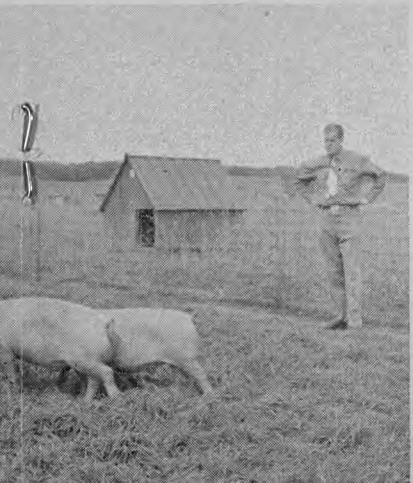
Bottom (left to right): J. A. New
X-ray in swine research. G. E. I
superintendents, respectively, in
G. H. Bowman studying skeletal
(X-ray picture); rib a



McFadden, senior agronomist in charge of cereal
t a Field Day; view of experimental plots (inset).
ecialist (center), recording observations on birdsfoot
nursery. H. T. Allen, horticulturist (extreme right)
ardener, examining tomato plants in the greenhouse;
rch emphasis is on earliness.

drous ammonia under pressure to soil fertility experi-
t; Laboratory facilities aid in the research work
Vegreville. J. R. Gillespie using the pH meter to
in the acidity of a soil sample.

A. Newman of the Animal Husbandry Division using
C. E. Delong and J. G. Stothart, former and present
y, inspecting a foursome of "Lacombe" gilts.
eletal development in baby pigs from a radiograph
rib and vertebrae counts can be made.



minimum of injury to the crop. Unfortunately none of the chemicals have been too effective in controlling wild oats in cereals whereas a combination of mixed farming rotations, early maturing varieties, delayed seeding, and post seeding practices have given a good measure of control.

Since 1955, engineering studies have been conducted on tillage machines as they affect trash cover, soil tilth or structure, and moisture conservation; on comparisons of various methods and machines for seeding cereals; and on the influence of time of swathing on yield and quality of malting barley. A project has also been initiated to assess the effect of packing on the quality of silage.

The Lacombe-directed Experimental Substation established at Vegreville in 1955 is investigating problems of production on Alberta's solonetz soils. These soils, which cover an area about 250 miles long and 35 miles wide (from Bruderheim in the north to Suffield in the south), have a workable, fertile but shallow surface layer underlain by a very compact, hardpan subsoil. In Alberta the hardpan layer is usually about 8 inches thick, preventing ready movement of soil water and nutrients, and inhibiting root penetration. Below the hardpan is a layer of soil containing heavy concentrations of salts, mostly gypsum. At Vegreville the effects of deep tillage, soil amendments, fertilizer treatments, and cropping methods are under study. The deep tillage experiments are designed to break up the hardpan layer and mix in the salts from the layer below. It is expected that these salts will keep the hardpan layer from re-forming. Similarly, the use of soil amendments such as gypsum, sulphur, krillium, manure, and straw are designed to prevent re-formation of the hard layer once it has been broken up. Rotations involving the use of deep-rooted legumes are being studied, alone and in combination with the use of deep tillage and soil amendments, to determine the effect of different crops on soil aeration and root penetration. Cereal and forage crop variety trials are in effect to study their adaptability on these soils.

FORAGE CROPS

Throughout the years much attention has been directed toward the solution of problems associated with the production of fodder and pasture crops. Originally most of the tests were conducted at Lacombe with only a limited amount of off-station testing but more

recently the work has been expanded until today trials are being conducted on each of the soil-climatic zones of the area. Of the wide variety of forage crops tested, alfalfa has become recognized as the best legume for inclusion with grass species in hay and pasture mixtures. The increasing importance of cultivated farm pastures has resulted in an expansion of the pasture research program with large-scale grazing trials being conducted to supplement the information obtained from small plot experiments. The Farm's bulletins — "The Production of Cheaper and Better Forage Crops for Livestock in Central Alberta" (1931) and "Improved Pasture Crops and Pasture Practices for Central Alberta" (1940) — present results of the experimental work which have been of value in the development of diversified farming. Current recommendations, based on recent studies at Lacombe supplementing earlier work, are given in the publications "Hay and Pasture Crops for Alberta" and "Grass and Legume Seed Crops for Alberta" as prepared by the Alberta Forage Crops Advisory Committee.

Forage crop seed production in Central Alberta today has attained significant proportions. Experiments with alsike clover on sulphur-deficient gray wooded soil have shown that suitable fertilizer will more than double seed yield. Cultural, management, and fertilizer requirements for seed production of Russian wild rye grass and creeping red fescue have been determined. In 1946 the Lacombe Farm co-operated with the Alberta Department of Agriculture in a study to determine the optimum time for harvesting alsike seed. Large seed losses, it was found, resulted from harvesting the crop when it was fully mature, whereas an average of 95 pounds more seed per acre was obtained by harvesting when approximately 60 per cent of the blossoms were brown.

Special studies with forage crops have yielded information of considerable practical significance. It was found that harvesting the second cutting of the alfalfa hay crop during the last two weeks of August and the first two weeks of September had a detrimental effect on winter survival and reduced subsequent hay yields. Later-cut alfalfa was more winter hardy and yielded approximately 15 per cent more hay the following year. Dates of seeding tests with various grasses and legumes demonstrated that crested wheat grass, brome, timothy, creeping red fescue, reed canary grass, and alfalfa established satisfactory stands when drilled directly into stubble between mid-August and mid-September, provided soil moisture conditions were favorable during that period. Sweet clover, red clover, and alsike seeded during the same period rarely established

a stand. Good stands of all species usually resulted from late fall seedings made after freeze-up and from early spring seedings.

Unsatisfactory inoculation has been an important factor contributing to the failure of alfalfa stands in certain areas of the gray wooded soil of west-central Alberta. Investigation into this problem has resulted in the selection of more effective strains of nitrogen-fixing bacteria. Future studies are being directed towards determining the effect of various soil treatments and different methods of inoculation.

In recent years interest has arisen in the possibilities for producing non-quota cash crops, such as oilseed rape and sunflowers, in Central Alberta. Tests are being conducted with these crops. Preliminary indications are that rape seed production has possibilities in the black soil zone but present varieties of sunflowers are too late maturing and too subject to seed loss through birds to be successful.

Red clover is an important legume in the black and wooded soil zones of the area both in hay and pasture mixtures and for seed production. However, presently grown varieties are susceptible to two diseases, northern anthracnose and powdery mildew. A program of breeding red clover for resistance to these diseases has been under way at Lacombe since 1947. Good progress has been made and the release of one or more improved strains of red clover possessing marked resistance to both diseases is expected soon.

HORTICULTURE

The farm garden has been vital since pioneer days and horticulture experiments started at Lacombe in 1908 have progressed steadily through the demonstrational stage to more detailed studies. Visitors admire the attractive park on the older part of the Farm. The transformation of this once treeless area is one result of these investigations.

For many years tests and demonstrations of varieties of ornamental trees, shrubs, and both annual and perennial flowers were the only work of the kind serving Central Alberta. Hundreds of tests were also conducted on varieties of bush and tree fruits, and vegetables. The results of these tests are used in the recommendations published annually by the Alberta Advisory Committee on Horticulture.

Since 1924 potato testing has received special attention. Over a hundred varieties and five hundred selected seedlings have been tested. The introduction of promising varieties, of which Canus is an example, has done much for potato production in the area.

Today the horticulture program involves breeding for earliness in tomatoes; testing and selecting potatoes in co-operation with the National Potato Trials; vegetable testing; and selection studies with apples, crabapples, and small fruits in co-operation with the Prairie Fruit Breeding Program.

ILLUSTRATION STATIONS

Illustration Stations are privately owned farms whose owners have entered into a co-operative agreement with the Experimental Farms Service. Some Stations were established in Central Alberta in the early 1920's, but it was not until 1939 that these and other units came under the supervision of the Lacombe Experimental Farm. At present there are ten Stations supervised from Lacombe. They are located at Acme, Castor, Metiskow, and Chauvin in the dark brown soil zone; St. Paul and Bonnyville in the black soil zone; and Athabasca, Evansburg, Leslieville, and Chedderville in the gray wooded soil zone.

Early work on the Stations was mainly demonstrational. This has expanded to include crop testing and experiments of a fact-finding nature. The latter are designed to establish suitable crop rotations, cultural and fertilization practices, and varieties of cereal and forage crops for the particular soil climatic zones.

The experimental work on the Stations has contributed to the following: The discovery of sulphur deficiency in gray wooded soils and the need for a combination of legumes, sulphur-bearing fertilizers and suitable crop rotations to increase production and maintain soil fertility; the use of farm rotations including grass-legume mixtures to increase production in all soil zones; the important role of strip farming and trash cover fallows in preventing soil erosion; the benefits of fertilizing cereal and forage crops on many of the soils in Central Alberta; the use of chemical sprays and suitable cultural practices in the control of weeds; increased production by the introduction of improved varieties of cereal and forage crops; and improved farm buildings. The loose housing barn at Athabasca (one of the first of its kind in the district) provided valuable information on this method of housing dairy cattle.

Present research being conducted on the Illustration Stations involves detailed studies on all phases of farm management. These studies are designed to compare farm enterprises and to determine the most economical means of crop production. In addition to these studies, testing of fertilizers, cereal and forage crops are being continued. The experimental results from these tests are used, with others, in formulating recommendations made by the Alberta Fertilizer Advisory Committee, the Alberta Cereal Variety Zonation Committee, and the Alberta Forage Crops Advisory Committee.

THE FUTURE

Although the full magnitude of future problems of agriculture in Central Alberta is unknown, it is certain that research will be constantly focused on maintaining and improving the fertility of the soil; that improved varieties of grain and forage crops will be developed which will not only yield better than those now grown under normal conditions but will also be resistant to the presently known diseases and pests and to the new handicaps which will inevitably arise; that more efficient farm animals will result from breeding principles only now being recognized; and that agriculture will benefit from new machinery, new methods, and new chemicals.

All these advances will not come about overnight nor will they be possible without careful and continuous research. The Lacombe Experimental Farm looks forward to a future of service to agriculture in general and to the farmers of Central Alberta in particular.

Solonetz Soil Research. One of the leads being investigated at the Vegreville Substation is in breaking the solonatzic layer and mixing the valuable salts which have leached below it with the "A" and "B" horizons. Photo opposite shows a trial being conducted with a four blade 38" disc plow.

TECHNICAL PERSONNEL

Experimental Farm ● **Lacombe, Alberta**

Superintendent ..... J. G. STOTHART, B.S.A., M.Sc.

ANIMAL HUSBANDRY

Sr. Animal Husbandman H. T. FREDEEN, B.S.A., M.Sc., Ph.D.
Animal Husbandman ..... G. H. BOWMAN, B.S.A., M.Sc.
Animal Husbandman ..... J. A. NEWMAN, B.Sc.
Animal Husbandman ..... H. DOORNENBAL, B.Sc., M.Sc.

CEREAL CROPS

Sr. Agronomist ..... A. D. McFADDEN, B.Sc., M.Sc.
Agronomist ..... M. L. KAUFMANN, B.S.A., M.Sc., Ph.D.

FIELD HUSBANDRY

Sr. Agronomist ..... H. A. FRIESEN, B.S.A., M.Sc.
Soil Fertility ..... D. R. WALKER, B.Sc.
Agricultural Engineer ..... D. A. DEW, B.E.

FORAGE CROPS

Sr. Agronomist ..... H. B. STELFOX, B.Sc., M.Sc.
(deceased April 1, 1957)
Agronomist ..... W. J. DORAN, B.Sc.

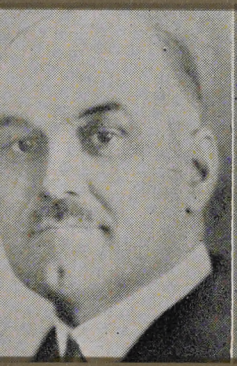
HORTICULTURE

Horticulturist ..... H. T. ALLEN, B.Sc., M.Sc.

ILLUSTRATION STATIONS

Supervisor ..... L. J. ANDERSON, B.S.A.
Supervisor ..... S. R. CHURCH, B.Sc.

SUPERINTENDENTS



G. H. HUTTON
1907-1920

F. H. REED
1921-1946

G. E. DELONG
1947-1955

J. G. STOTHART
1955-